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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/173,129 10/15/98 PARK

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EXAMINER	

MM22/1015

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PATENT UNIT, G	PAPER NUMBER
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DATE MAILED:

10/15/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/173,129

Applicant(s)

PARK ET AL.

Examiner

Ginette Peralta

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claims ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☐ received.
 2. ☐ received in Application No. (Series Code / Serial Number) ____.
 3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 14) ☒ Notice of References Cited (PTO-892) 17) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 15) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 18) ☐ Notice of Informal Patent Application (PTO-152)
- 16) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 19) ☐ Other:

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DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 9, 10, 11, 13, 14 and 15 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kobayashi et al. (U.S. Pat. 4,505,028).

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 3, 4, 5, 6, 7, 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komori et al. (U.S. Pat. 5,352,620) in view of Kobayashi et al. (U.S. Pat. 4,505,028) and Wolf.

Komori et al. teaches a method of fabricating an electrical device as in Fig. 13 formed in a semiconductor substrate comprising the steps of forming an insulating layer 8 over the semiconductor substrate 5, forming a silicon containing structure 11 on the

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insulating layer 8, forming a conductive structure 25 on the silicon containing structure 11, and oxidizing a portion of the insulating layer 8 and the silicon containing structure 11 by a process that comprises the selective oxidation of silicon and leaving the conductive structure substantially unoxidized by introducing an oxygen-containing gas and a separate hydrogen-containing gas.

With respect to claim 2, the process is used for forming a transistor or a capacitor.

With respect to claim 5, the insulating layer comprises silicon dioxide.

With respect to claim 6, the silicon-containing structure comprises polycrystalline silicon.

With respect to claims 7 and 8, the conductive structure comprises tungsten, which is an oxygen-sensitive material.

Komori et al. does not show the oxygen-containing gas and the hydrogen-containing gas.

Kobayashi et al. teaches a method of oxidizing that comprises H_2O used as the oxygen-containing gas and H_2 used as the hydrogen-containing gas.

Wolf teaches an oxidation process where the oxygen containing gas may be either H_2O or O_2 .

Komori et al. oxidizes by the process taught by Kobayashi, therefore it is obvious that this two references can be combined. Furthermore, Wolf teaches that the oxygen-

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containing gas may be O₂. Therefore it would have been within the scope of one of ordinary skill in the art to use either gas for the oxidizing step.

3. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al.

Kobayashi et al. teaches a method of oxidizing a first feature while leaving a second feature substantially unoxidized, the method comprising subjecting the first and second features to an oxygen-containing gas and a separate hydrogen-containing gas, the oxygen-containing gas comprises H₂O, the hydrogen-containing gas comprises H₂, in Column 8, lines 39-56, the first feature comprises polycrystalline silicon and the second feature comprises tungsten, in Column 5, lines 1-45, the first feature comprises silicon oxide, which is a dielectric material, and the second feature comprises tungsten.

4. Claims 16, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komori et al.

Komori et al. teaches a method of fabricating a memory cell as in Fig. 13 formed in a semiconductor substrate comprising the steps of providing a conductive layer 9 over the semiconductor substrate 5, providing a dielectric material 10 over the conductive layer 9, subjecting the conductive layer 9 and the dielectric material 10 to an oxygen-containing gas and a separate hydrogen-containing gas, wherein the dielectric material is oxidized and the conductive layer remains substantially unoxidized, oxygen-containing gas comprises H₂O, and the hydrogen-containing gas comprises H₂.

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It would have been within the scope of one of ordinary skill in the art to use this process for the construction of a reliable capacitor as it would improve the charge retention characteristics and speed up the operating speed of the device by reducing the resistance of the control gate of the memory cell.

5. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komori et al. as applied to claims 16, 17 and 18 above, and further in view of Wolf.

Komori et al. as used above does not show the use of a dielectric material comprising a material selected from the group consisting of an oxide/nitride stack, BST, tantalum pentoxide or PZT.

Wolf teaches in Page 598 the use of tantalum pentoxide and oxide/nitride stacks instead of silicon oxide for a capacitor dielectric.

It would have been obvious to one of ordinary skill in the art to use either tantalum pentoxide or an oxide/nitride stack as dielectric as taught by Wolf, as these materials can increase the cell capacitance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ginette Peralta whose telephone number is (703)305-7722. The examiner can normally be reached on Monday to Friday 8:00 AM-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703)306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7722 for regular communications and (703)308-7724 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

A handwritten signature in black ink, appearing to be a stylized 'GP' or similar initials.

GP

October 12, 1999